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Invention: MESSAGE EXCHANGE AND METHOD FOR DISSEMINATING MESSAGES IN TELEPHONE NETWORKS

Inventor (s): MESSMER, Bruno

Pillsbury Winthrop LLP
Intellectual Property Group
1100 New York Avenue, NW
Ninth Floor
Washington, DC 20005-3918
Attorneys
Telephone: (202) 861-3000

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SPECIFICATION

Message Exchange and Method for Disseminating Messages in Telephone Networks

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The present invention relates to a message exchange and a method for disseminating messages in telephone networks. In particular it relates to a message exchange and a method for receiving and storing spoken messages and for transmitting these messages to one or more subscribers, to whom the messages are addressed, in the public switched telephone network.

The patent document EP 0 377 379 A1 describes an automatic telephone call device, which makes it possible to store messages and associated transmission profiles with the number of the addressee, date and point in time of the first message transmission, frequency of further transmission attempts as well as date and point in time of the last transmission attempt, the messages and transmission profiles being able to be entered from a distance via a telephone connection. If a plurality of users want to avail of the services of a telephone call device described in EP 0 377 379 A1, they must have at their disposal a device of their own connected to the public switched telephone network since the telephone call device described in EP 0 377 379 A1 is not suitable for a plurality of users. Moreover the telephone call device described in EP 0 377 379 A1 does not make it possible for a user to transmit a message to a plurality of addressees.

Described in the patent document 0 177 405 A1 is a radio telephone system for automobiles, which can be controlled by the user via a speech recognition module. In particular, messages can also be prepared, stored and transmitted, using stored telephone numbers, with the voice-controlled system described. The radio telephone system described in EP 0 177 405 is also designed for just one user, and does not allow the user to transmit a message to a plurality of addressees.

The patent U.S. 4,856,066 describes an electronic system and a method for preparing, storing and transmitting messages by means of spoken language. In particular, the patent U.S. 4,856,066 describes the possibility of determining one or more addressees (groups) by means of spoken input. Routing instructions or switching commands are obtained through analysis of entered commands word-wise or by querying stored information on the basis of spoken commands. Stored messages can be transmitted at predetermined points in time, also given orally. As in the documents described above, the patent U.S. 4,856 066 also describes a system, and respectively a method, which are not designed for a plurality of users.

The patent U.S. 5,146,487 describes a method which permits a user of a telephone apparatus to prepare a message and to determine an addressee associated therewith, and to have the message transmitted to this addressee by pressing corresponding input keys under menu control. The method described in the patent U.S. 5,146,487 is not designed to transmit a message to a plurality of addressees. Although the method described in U.S. 5,146,487 is suitable for receiving and storing messages from a plurality of users, no direct reply can be transmitted to the writer of a message.

It is an object of this invention to propose a new device and a new method for receiving, storing and transmitting spoken messages in telephone networks which in particular make it possible to receive messages from a plurality of subscribers of a public switched telephone network.

This object is achieved, according to the present invention, through the elements of the characterizing portion of the independent claims. Further preferred embodiments follow moreover from the dependent claims and from the description.

In particular, these objects are achieved by means of the invention in that the device is a message exchange which is connected to the public switched telephone network, and in that this message exchange comprises a receiving module which can receive spoken messages from a plurality of subscribers in the said telephone network via this said telephone network, and which stores a received message in each case together with an automatically determined identification, for example the call number, of the subscriber who has placed the message, and in that this message exchange comprises a transmission module which can transmit stored messages to the respective subscribers by means of automatic call. Such a message exchange has the advantage that the subscribers in the telephone network do not need any special, personal terminals to store messages and to transmit them to one or more subscribers in the telephone network. Moreover a message transmitted to such a message exchange and stored there can be clearly assigned to the transmitting subscriber, so that, for example, results about the outcome of the message transmission and/or replies of the receiving subscriber can be transmitted to this transmitting subscriber.

The message exchange preferably comprises an address module in order to store a plurality of lists with subscriber identifications, these lists being assigned in each case to at least one subscriber in the said telephone network

and being able to be administered by this subscriber with services of the address module. In an embodiment variant, these lists can also contain access rights so that, for example, access to a certain list can be permitted for all subscribers who are entered in the respective list.

In different embodiment variants, a subscriber identification in the said list comprises the name and/or call number of a subscriber. Moreover, in the said address module, at least certain subscriber identifications in a said list of a subscriber are preferably combined into a group to which messages can be addressed. In a variant, at least certain of the subscriber identifications are stored as voice signals.

In a preferred embodiment, the message exchange comprises a speech recognition module so that subscribers can address messages to subscribers and/or groups of subscribers by designating the respective subscribers or groups of subscribers by means of spoken speech and transmitting them <*sic. the designations*> to the message exchange, the speech recognition module identifying in the said list of the respective subscriber the subscribers and/or groups of subscribers designated by the subscriber. In an embodiment variant, this speech recognition module makes it possible, moreover, for subscribers to create and administer the said lists by means of spoken language.

In different embodiment variants, the message exchange comprises at least one tariff table and/or one table with statistical information about the traffic load in the said telephone network, the transmission module of the message exchange being able to transmit messages to the addressed subscribers at times having economical tariffs or at times of low traffic load.

The transmission module of the message exchange preferably stores status information relating to the transmission of messages to subscribers, and can transmit unsuccessfully transmitted messages repeatedly.

The message exchange preferably comprises a reply module, which receives replies of a subscriber, to whom messages were transmitted, and can store them for the respective subscriber who transmitted the message. In a preferred embodiment variant, the said reply module can receive, store and transmit to the addressed subscribers messages, which can be addressed to a group of subscribers, as reply from a subscriber to whom messages were transmitted.

In an embodiment variant, at least certain messages are transmitted via the Internet, a corresponding gateway being switched in each case between the public switched telephone network and the Internet.

An embodiment of the present invention will be described in the following with reference to an example. The example of the embodiment is illustrated by the following attached figures:

Figure 1 shows a block diagram that illustrates schematically the structure of a message exchange which is connected to the public switched telephone network.

Figure 2 shows a flow chart, which depicts the execution of a message transmission in a simplified way.

The reference numeral 2 in Figure 1 refers to the public switched telephone network, to which a plurality of terminals 21-24 are connected, these terminals 21-24 also representing the respective subscribers 21-24 in the public switched telephone network 2.

The reference numeral 1 refers to an embodiment example of the message exchange according to the invention, which is connected to the public switched telephone network 2. The message exchange 1 comprises a plurality of modules, which we shall go into in more detail later, on at least one server, for example a commercially available server having the necessary means to be connected to the public switched telephone network 2, or a commercially available telephone switching center.

The message exchange 1 comprises a receiving module 3, which is a software module, i.e. a computer program, which is installed on the server of the message exchange 1 and which has a memory area 31 assigned to it, for example on one or more hard disk memories which are located on the server or in a drive connected to this server. A subscriber 21, who would like to have a spoken message transmitted to one or more other subscribers 22-24 in the public switched telephone network, calls, for example, the service number of the message exchange 1. The receiving module 3 of the message exchange 1 receives the call through conventional communications services, and determines automatically the identification of the calling subscriber 21, for example the call number. Afterwards the receiving module 31 guides the calling participant 21 through the receiving procedure by means of spoken instructions, a spoken message and the identification of one or more subscribers to whom the message is supposed to be transmitted are thereby queried from the subscriber 21 and

received. The receiving module 3 stores the message M, for example in digital form, the automatically determined identification S of the transmitting subscriber 21, for example his call number, as well as the identifications of the subscribers to whom the message is addressed, i.e. the addressees A of the message to be transmitted, in the table 31, which is schematically illustrated in Figure 1. As indicated in Figure 1, the table 31 can also store other data elements, which are entered by the transmitting subscriber 21, for example a date and/or an indication of time when or before when the message is supposed to be transmitted to the addressees. In Figure 1the table 31 has in addition a status field T, which we shall describe later.

There are different possible embodiment variants for the entering and storing of the identification of the subscribers to whom the message is addressed. In a first variant, by means of the dial keys of his terminal, for example a telephone, the transmitting subscriber can determine an addressee by entering the call number of the addressee. This call number can then be received by the receiving module 3, checked, and stored in the table 31. This variant has the advantage that it is simple to implement, but has, however, the disadvantage that its use is inconvenient for the transmitting subscriber above all when this transmitting subscriber wishes to transmit the message to a plurality of subscribers.

In a second variant, the addressee is determined by the transmitting subscriber by entering the name by means of the selection keys of his terminal or an identification number of a subscriber or a group of subscribers by means of selection keys of his terminal. In this variant, the typed-in name or the identification number is received by the receiving module 3 and compared, for example, with the entries in a personal list 41 of the transmitting subscriber 21, the administration of which we shall go into later. As can be learned from the table 41, illustrated schematically in Figure 1, the value of the entered group G=g1 corresponds, for example, to two subscribers with the names N=n1 and N=n2, or respectively their call numbers R=r1 and R=r2, or the value of the entered name N=n3 corresponds to the call number R=r3. The receiving module 3 can correspondingly enter the call numbers r1 and r2, or respectively r3 in table 31, as the identification of the subscribers to whom the message is supposed to be transmitted, i.e. the addressee A. It is preferable to have this conversion of the typed-in values into the corresponding call numbers carried out directly by the receiving module because any possible discrepancies, for example missing entries, can be corrected by the transmitting subscriber 21. This second variant

has the advantage over the first variant that the transmitting subscriber 21 has to type in fewer digits.

In a third preferred variant, the transmitting subscriber 21 determines the addressees by transmitting the names thereof and/or the name of a group of subscribers by means of spoken language to the message exchange 1, where they are received by the receiving module 3. In a similar way as in the second variant, the receiving module 3 compares the received names and/or names of groups with the entries in the above-mentioned personal list 41 of the transmitting subscriber 21, and determines the call numbers belonging thereto. In addition, the services of a speech recognition module 8 of the message exchange 1 can be used thereby, which are based on commercially available software programs and which convert the received spoken names into text that is compared with the alphanumerically stored names and/or group names of the personal list 41. As an alternative, the receiving module 3 can have at its disposal programmed comparison algorithms by means of which the received spoken names are compared with the names or group names of the personal list 41 which are stored as voice signals in this case. Preferable is that group names, for example the value of g1, are converted directly at this point in time into the corresponding subscribers associated thereto, for example into the values of the call numbers r1 and r2.

There are different possibilities for a subscriber 21-24 to administer his personal list by means of the services of an address module 4, the address module 4 being once again a software module, which is installed, for example, on the server of the message exchange and which has a memory area 41 assigned to it, which is also accessible to the receiving module 3. In a similar way as has been described for placing a message, a subscriber 21-24 can call the service number of the message exchange 1 – different service numbers can be thereby provided for placing a message and for administering personal address lists 41, for example, or the various functions can be selected under a joint service number by means of a voice-controlled menu. The address module 4 of the message exchange 1 guides the interested subscriber 21-24, by means of spoken instructions, through the administrative procedure for his personal list 41 of subscribers to whom he wishes to have messages transmitted. Thereby received by the interested subscriber 21-24, and stored in the list 41, shown schematically in Figure 1, depending upon the embodiment variant, are the names N and/or call numbers R of subscribers as well as groups of subscribers, which consist of a group name G and the associated participants N, R. In different variants, the

values are typed in by the interested participant 21-24 by means of the keys of his terminal, or are transmitted by spoken language. Values which are transmitted by spoken language, for example the name of a participant or of a group of participants, can be stored as voice signals by the address module 4, or converted by means of the above-mentioned service of the voice recognition module 8 and stored as alphanumerical data.

In an additional or alternative variant, a subscriber 21-24 can administer his personal list by means of Internet services of the address module 4 to which he has access via the Internet (not shown). In this case, at least certain services of the address module 4 are available as programmed functions via a web server. The advantage of administration of the personal lists by means of Internet services is that an easy-to-use graphic user interface is thereby offered to the interested subscribers that is suitable for the input of alphanumerical information and in particular for an efficient administration of the above-mentioned groups.

As is indicated in Figure 1, other information can also be stored in the lists 41, in addition to the subscriber identifications, for example access rights by means of which writing and/or reading access to an entry in a personal list, or access to an entire personal list, can be permitted or respectively blocked for other subscribers, for example all subscribers who are contained in this list or only certain selected subscribers. These access rights can also be administered, for example, by means of services of the address module 4, in a similar way as described above.

In the message exchange 1, a message M, which was stored in the table 31 together with the identification S of the transmitting subscriber 21 and the identification A of one or more subscribers, is transmitted by a transmission module 5 to the addressee or addressees. The transmission module 5 is once again a software module, i.e. a computer program, which is installed on the server of the message exchange and which has access to at least one tariff table 9, which is filed, for example, on one or more hard disk memories located on the server of the message exchange 1 or in a drive connected to this server. The point in time of the transmission of a message is determined, for example, by the transmission module 5 taking into consideration the above-mentioned data and/or time indications as well as the tariff levels stored in the tariff table 9. In addition, or as an alternative, the point in time of the transmission can also be made dependent upon the load on the public switched telephone network 2, which *<information>* is supplied to the transmission module 5 by a module 6 for determination of the traffic load. The module 6 can be designed by one skilled in

the art in such a way that it determines the current load on the public switched telephone network 2 or in such a way that it has this load stored in a table 61 as a statistical value captured from an external process.

Shown simplified in a flow chart in Figure 2 is the transmission of a message to an addressee with reference to an example. In step 201, with the aid of conventional communications services, the transmission module 5 of the message exchange 1 calls the call number of a subscriber 22-24, which is filed in the table 31, as described above, for the respective message.

In addition, or as an alternative, the transmission module 5 can also have access to the Internet, so that, starting at a certain tariff level, for example, e.g. for long-distance calls over great distances, the call to the subscriber can be established via the Internet, and the message transmitted via the Internet, a corresponding gateway between the public switched telephone network and the Internet being used in each case.

In step 202, the transmission module 5 determines whether the connection to the terminal of the called subscriber is busy (occupied). If this is the case, the transmission module 5 continues in step 213, where the call is terminated. As we shall describe later on, a corresponding status is then set and a new attempt to transmit the message is made at a later point in time. In an alternative variant, the transmission module 5 waits in step 203, as indicated in broken lines in Figure 2, for example for a predetermined time, and then calls the respective subscriber again in step 201.

When the connection to the called subscriber is not busy (unoccupied), the transmission module 5 transmits, in step 204, a spoken announcement of the message, and asks the called subscriber whether he would like to hear the announced message. The corresponding text reads for example as follows: "This is a message from Mr. X. The message will be played to you in three seconds. Please answer with yes or no as to whether you would like to hear the message."

In step 205, after a predefined time span, the transmission module 5 checks the answer of the called subscriber to the question posed in step 204, for example with the aid of the above-mentioned speech recognition module 8. If the answer is no, the transmission module continues in step 213, where the call is terminated. Otherwise, if the answer is yes, or if no answer is given, for example because the call was received by an automatic telephone answering machine, the respective message M stored in table 31 is played to the called subscriber in step 206.

After the message has been played, the transmission module 5 transmits in step 207 the spoken question as to whether the called subscriber would like to hear the message again, for example:

"Please answer with yes or no as to whether you would like to hear the message again."

In step 208, the transmission module 5 checks the answer of the called subscriber, after a predefined time span, to the question posed in step 210 <*sic. 207*>, for example, as mentioned above, with the aid of the speech recognition module 8. If the answer is yes, the transmission module 5 continues in step 206, and repeats the playing of the message. If the answer to the question in step 207 is no, the transmission module 5 continues in step 210. If no answer was given to the question in step 207, for example because the call was received by an automatic telephone answering machine, it is checked in step 209 whether the respective message has already been played again to the called subscriber, for example by means of a flag provided for this purpose. If the message has already been played again to the called subscriber, the transmission module 5 continues in step 213, where the call is terminated. Otherwise, if the message has not yet been played again to the respective subscriber, the transmission module 5 sets the above-mentioned flag, and continues in step 206, where the playing of the message is repeated.

In step 210, the transmission module 5 transmits the spoken question to the called subscriber as to whether he would like to give a reply to the subscriber who transmitted the message, for example:

"Please answer with yes or no as to whether you would like to give a reply."

In step 211, the transmission module 5 checks, after a predefined time span, the answer of the called subscriber to the question posed in step 210, for example, as mentioned above, with the aid of the speech recognition module 8. If the answer is no, or if no answer is given, the transmission module 5 continues in step 213, where the call is terminated. Otherwise, if the answer is yes, the transmission module 5 activates, in step 212, the reply module, a software module, which receives a spoken reply from the called subscriber and stores it in a memory area accessible to it. The memory area is a table 72, for example, which is filed for instance on one or more hard disk memories located on the same server or in a drive connected to this server. In addition, the reply module 7 also sees to it that the stored answer is linked to the respective message and the

respective called subscriber, for example in that a respective indicator is entered in the table 31 for the respective message M.

In an embodiment variant, the reply module 7 can be designed in such a way that it offers the called subscriber the option, for example by means of spoken guidance, of transmitting a message, instead of a simple reply, to the transmitting subscriber, and optionally to other subscribers, for example to all or to selected subscribers to whom the original message was addressed, or also to other subscribers. For reasons of confidentiality, this embodiment variant can be implemented in such a way that this option can be blocked by the subscriber who placed the original message, for example if this subscriber does not want to let the called subscriber know to whom the message was addressed, or the access to this option can be controlled by means of the above-mentioned access rights to the entries in a personal list 41. In principle, the reply module 7 can be achieved in such a way that it offers the called subscriber the functionality of the receiving module 3, as described above, in order to make it thereby possible for him to place a message himself in reply to the received message and to have it transmitted by the message exchange 1 to a group of subscribers.

As was already mentioned above, the transmission module 5 terminates the call to the called subscriber in step 213. Then, in step 214, the status information T corresponding to the outcome of the call, that means corresponding to the outcome of the transmission of the message M to the called subscriber, is entered in the table 31. The status information for a message to a particular subscriber contains, for example, information about the success or failure of the transmission of this message, about the number of transmission attempts, about the point in time of the last transmission, or about the availability of a reply from the called subscriber. As already mentioned, for messages which could not be successfully transmitted, another attempt is made at a later point in time, it being possible, for example, to limit the number of attempts to be repeated to a predefined number.

This status information as well as the received and stored replies can be made accessible to the respective transmitting subscriber, for example by means of a query module 10. The query module 10 is again a software module, which is installed, for example, on the server of the message exchange, and which has access to the information in the table 31 and to the stored replies in the table 72. A subscriber 21-24 can call the service number of the message exchange 1, for example, as already described above, it being possible, for example, to provide for different service numbers for placing a message, for administering personal

address lists 41, or for asking for status information and replies, or it being possible to select the different functions under a joint service number by means of a voice-controlled menu. The query module 10 of the message exchange 1 guides the interested subscriber 21-24, by means of spoken instructions, through the querying procedure for information about his placed messages. Similar to the way described for the administration of the personal lists, this query service could also be offered by means of Internet services via a web server.

The message exchange 1 described, as well as the method of receiving, storing and transmitting messages in telephone networks, is <*sic. are*> suitable for the most varied applications. For example, groups of people, e.g. a school class, a sports team, or in a completely general way an interest group, can thereby be informed about an upcoming event or a change in schedule, for example, without the caller having to carry out each individual call – and in particular repeated calls, owing to lines which are busy (occupied)– by himself manually. With the described invention, it is also possible to carry out automatic polls in that a predefined group of called persons is asked questions which they can answer. It is of course also practical to have a message transmitted to individual persons who are hard to reach, without having to obtain and install a message device of one's own for this purpose.

It should also be mentioned here that, for certain applications, it can definitely be preferable for subscribers to be able to register themselves in public groups intended therefor; depending upon the application, such a public group can be accessible free or by payment only. The access to a public group can take place, for example, via Internet services intended therefor. All subscribers, who have registered in such a public group, will then receive a call with a message to which they can also reply, if need be.

Although this has not been mentioned so far, it is definitely also possible with the present invention to transmit fax messages and/or other data instead of, or in addition to, the spoken messages.

An operator of a message exchange can offer interested subscribers the services described above, for example at a flat rate tariff, or he can bill them according to the number of transmitted messages. Moreover it can also be advantageous to bill for the memory area used by the respective subscriber for storing his personal subscriber list and/or the placed messages.

In addition to the sale of complete message exchanges to interested operators, it can also be interesting to market the described software programs

separately, for example by means of data carriers with programs stored thereon for control of computers, e.g. commercially available servers, according to the method described.